



SPC National Fire Weather Outlooks

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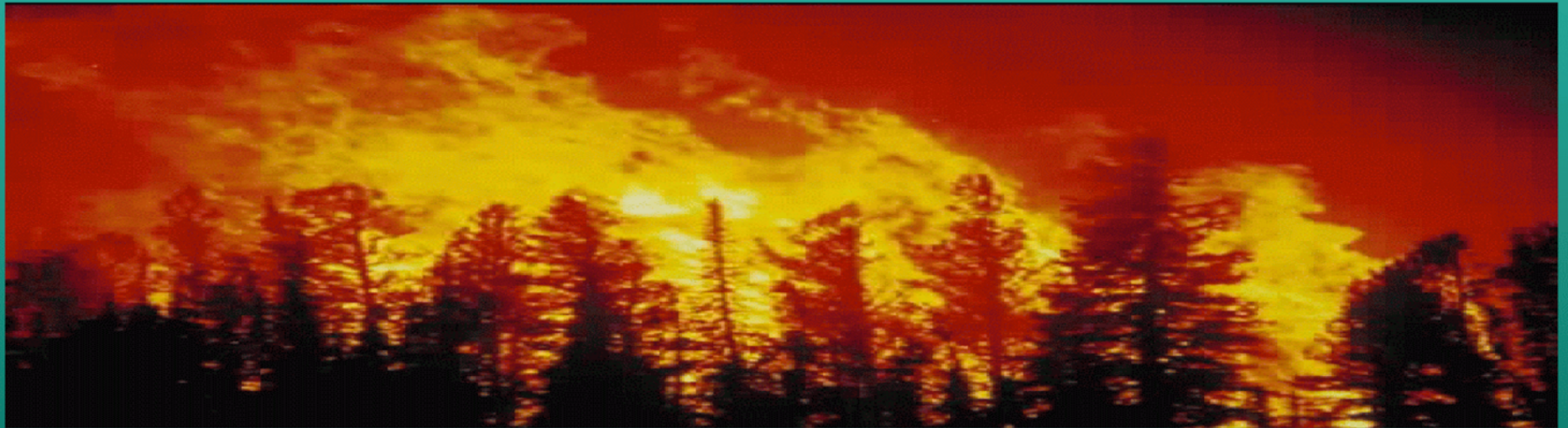


March 4, 2005

Dr. Phillip Bothwell

WHERE AMERICA'S CLIMATE AND WEATHER SERVICES BEGIN

DAY ONE / DAY TWO FIRE WEATHER OUTLOOKS



Delineate areas where forecast weather conditions for the upcoming 24 - 48 hour period combined with the pre-existing fuel conditions would result in a significant threat for wildfires

OUTLOOK CATEGORIES

CRITICAL AREAS

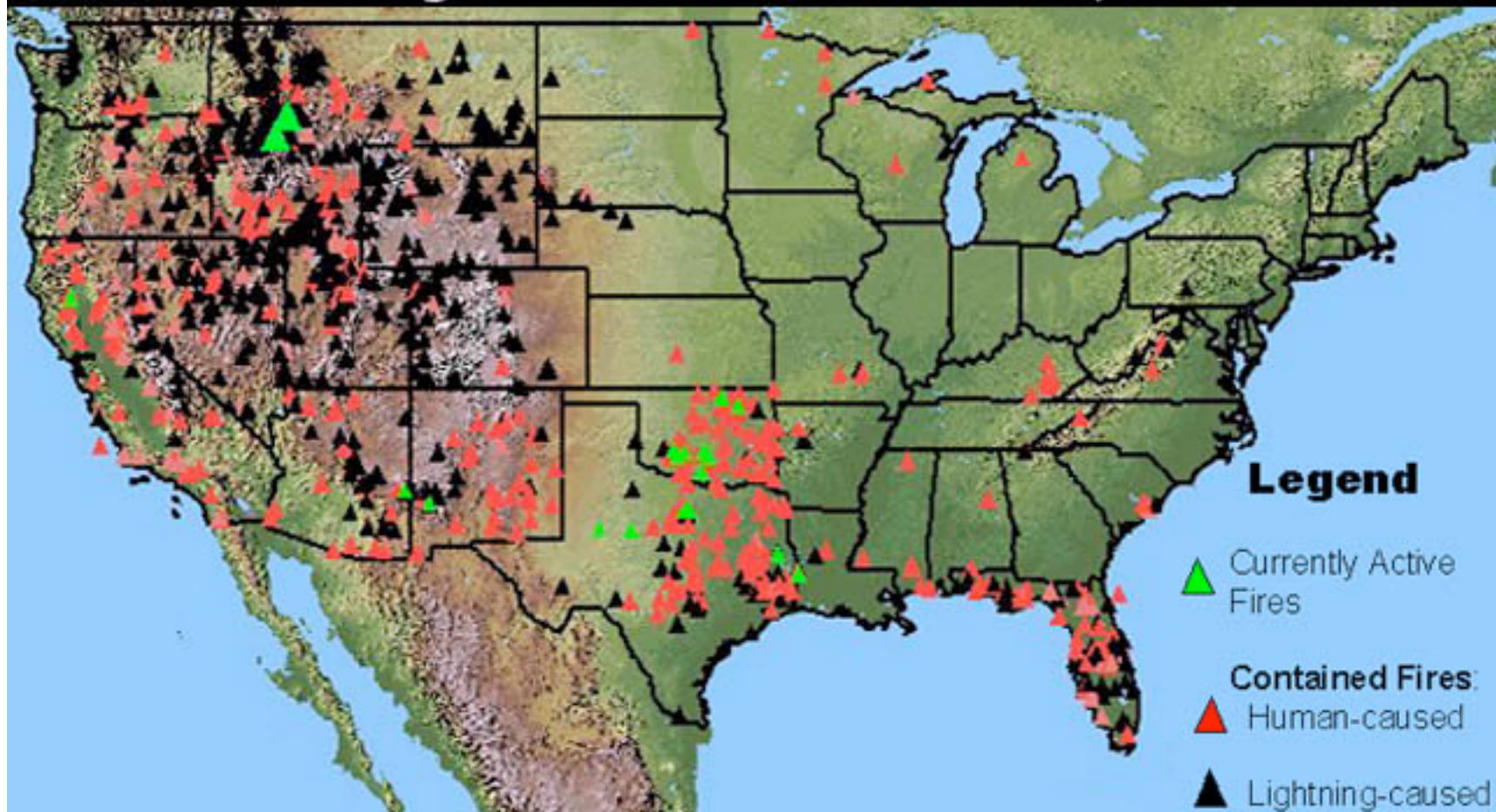
EXTREMELY CRITICAL AREAS

DRY THUNDERSTORMS AREAS

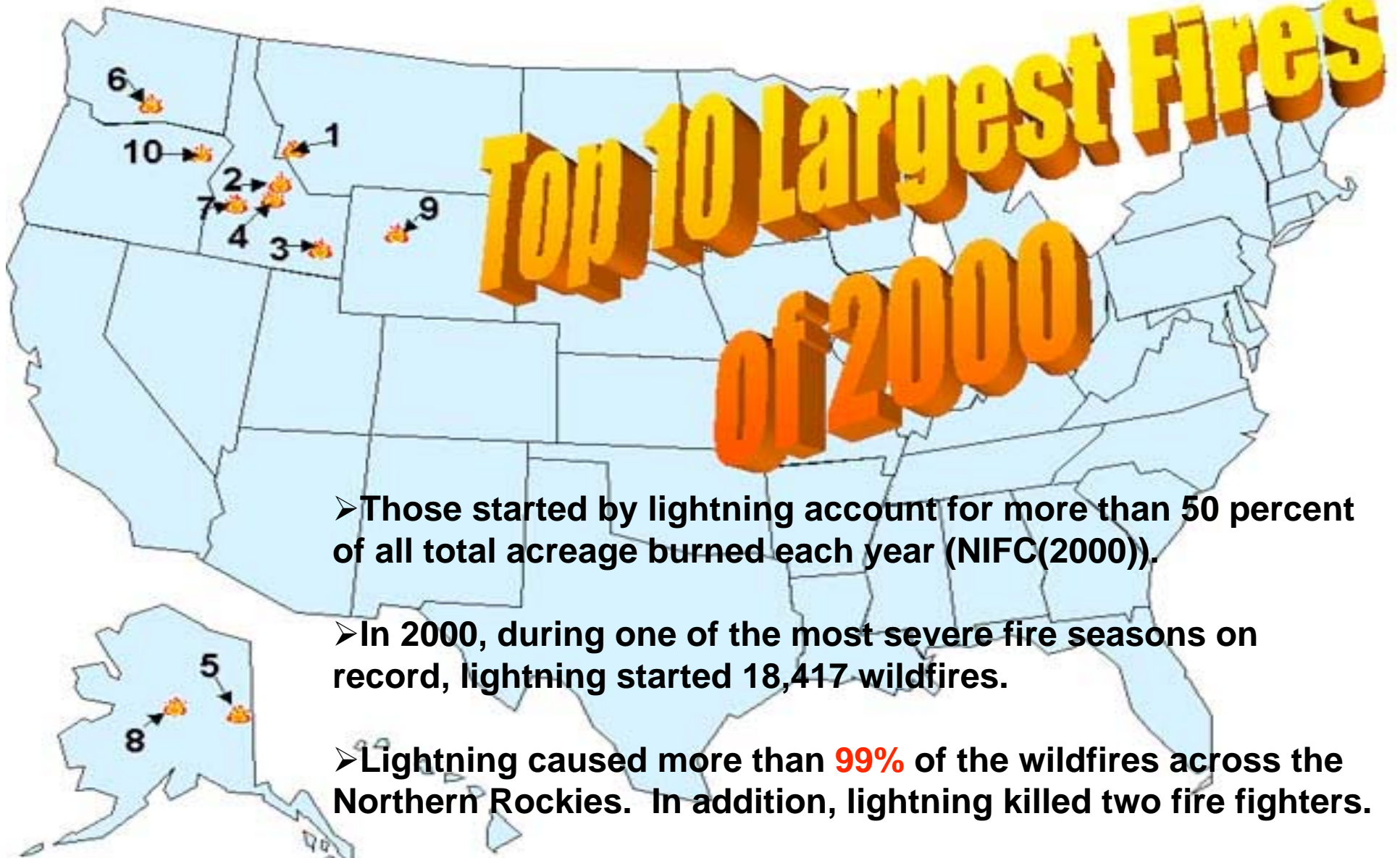
- **CRITICAL/EXTREMELY CRITICAL AREAS** ARE PRIMARILY FOR ANOMALOUSLY LOW RH/HIGH WIND EVENTS
- **DRY THUNDERSTORM OUTLOOK** IS TO PINPOINT WHERE SCATTERED/NUMEROUS DRY THUNDERSTORMS (< 0.1") LIKELY

Large Fire Locations

January 1 to October 3, 2000



Top 10 Largest Fires of 2000



- Those started by lightning account for more than 50 percent of all total acreage burned each year (NIFC(2000)).
- In 2000, during one of the most severe fire seasons on record, lightning started 18,417 wildfires.
- Lightning caused more than **99%** of the wildfires across the Northern Rockies. In addition, lightning killed two fire fighters.
- At that time, it required the largest peacetime mobilization of resources in our nation's history.


SPC Fire Weather Outlooks are available on both the WEB and AWIPS

<http://www.spc.noaa.gov/fire>

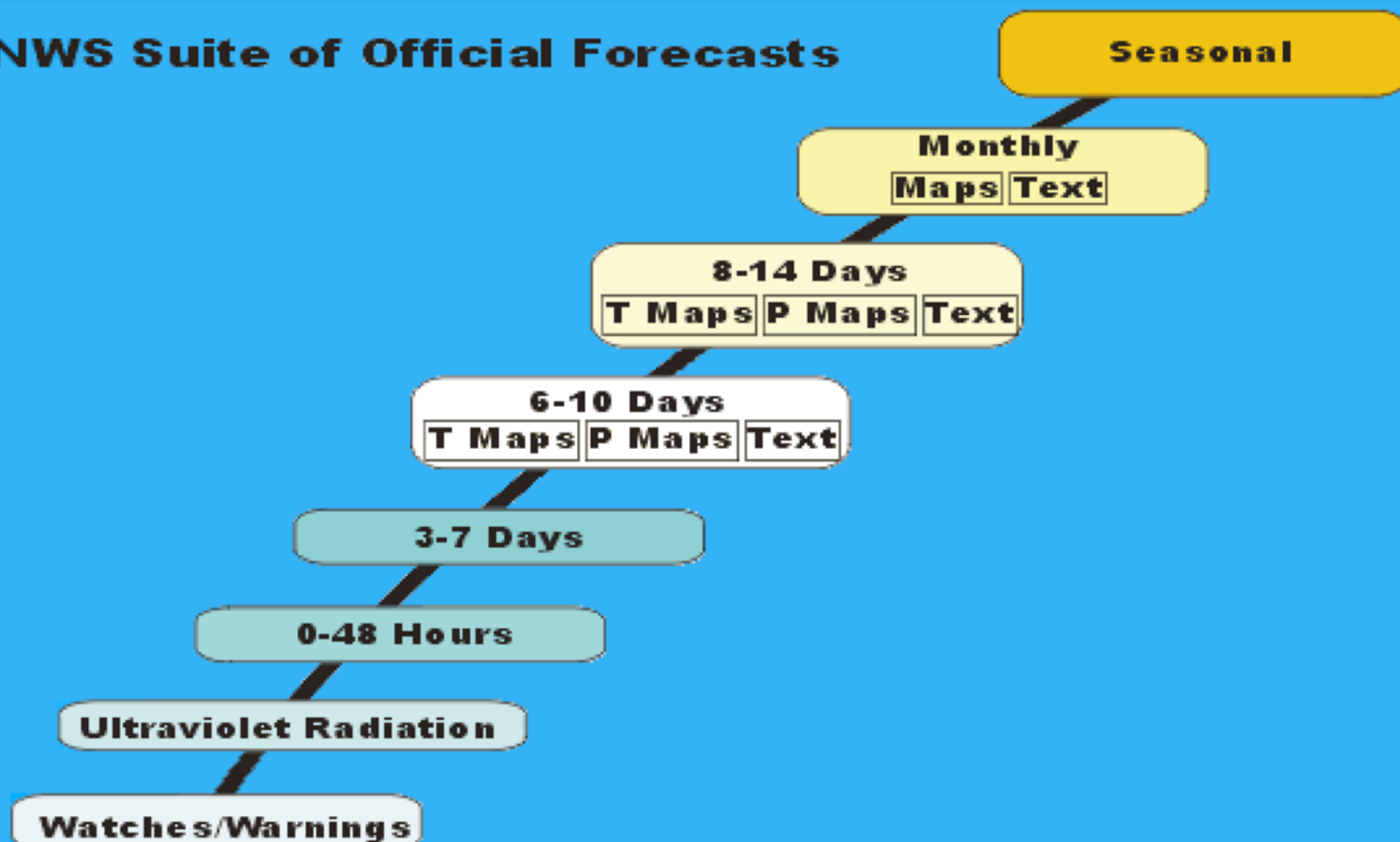
New in **2005** - SPC will be testing and evaluating an experimental Day 3 through 8 WEB graphic (“in house” for *.gov domains) for expected critical fire weather areas. **2006** graphic scheduled to be available on WEB – unrestricted (after test and evaluation)

NWS FIRE WEATHER SERVICE

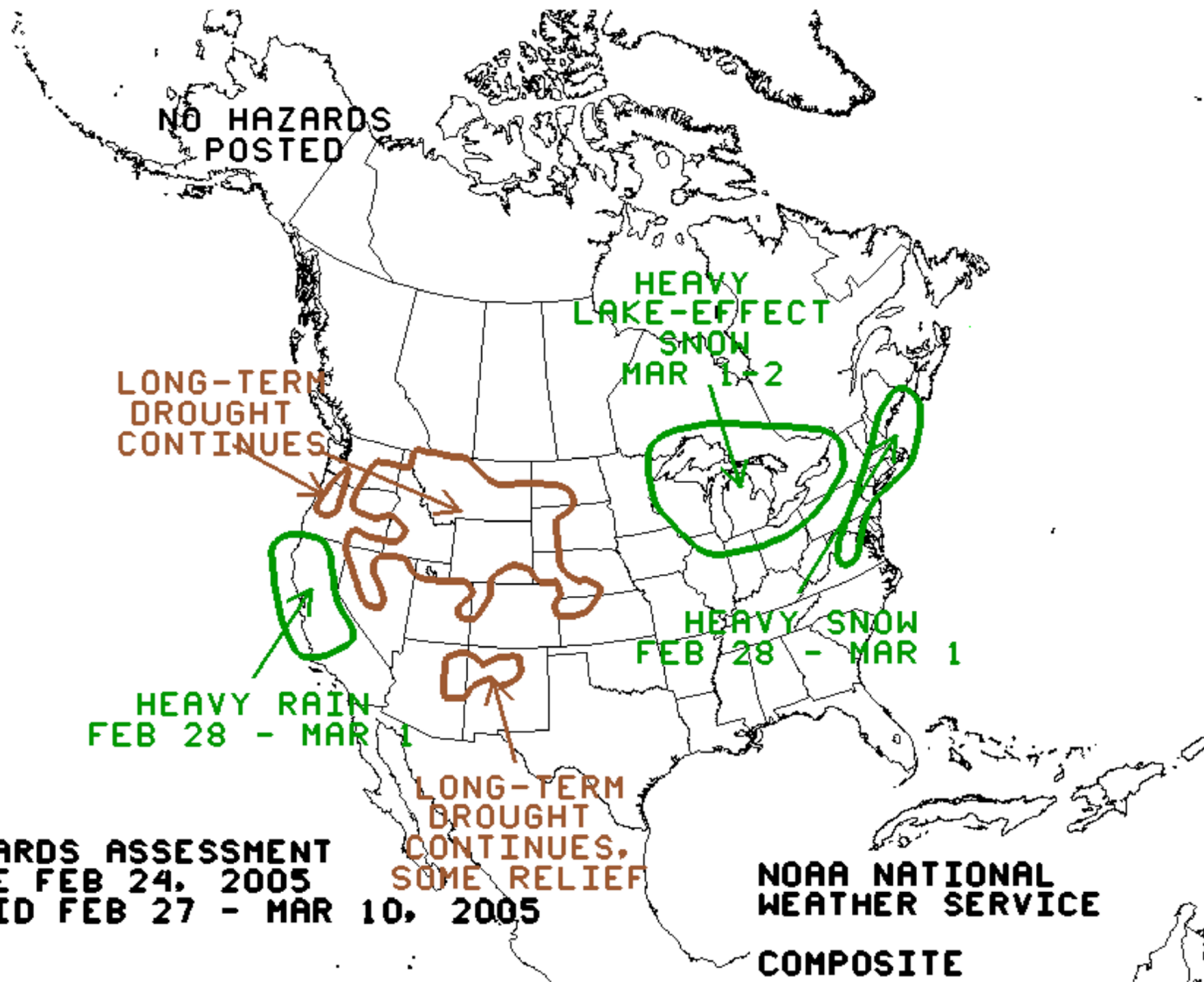
(from large time/space scales to individual fires)

- 
- **CPC** - Monthly and Seasonal Forecasts, 3 to 7 day Threats Assessment, Weekly Drought Monitor, 6-10 day (& 8-14 day) Temperature/Precipitation Outlooks
 - **HPC** - Fronts/pressure systems (Day 3 to 7)
 - **SPC** - 1& 2 day Fire weather outlooks- *started 1998*
 - **WFOs** - Fire Weather Watches and Red Flag Warnings, Spot Forecasts
 - **IMETS** - Fire weather forecasts

NWS Suite of Official Forecasts

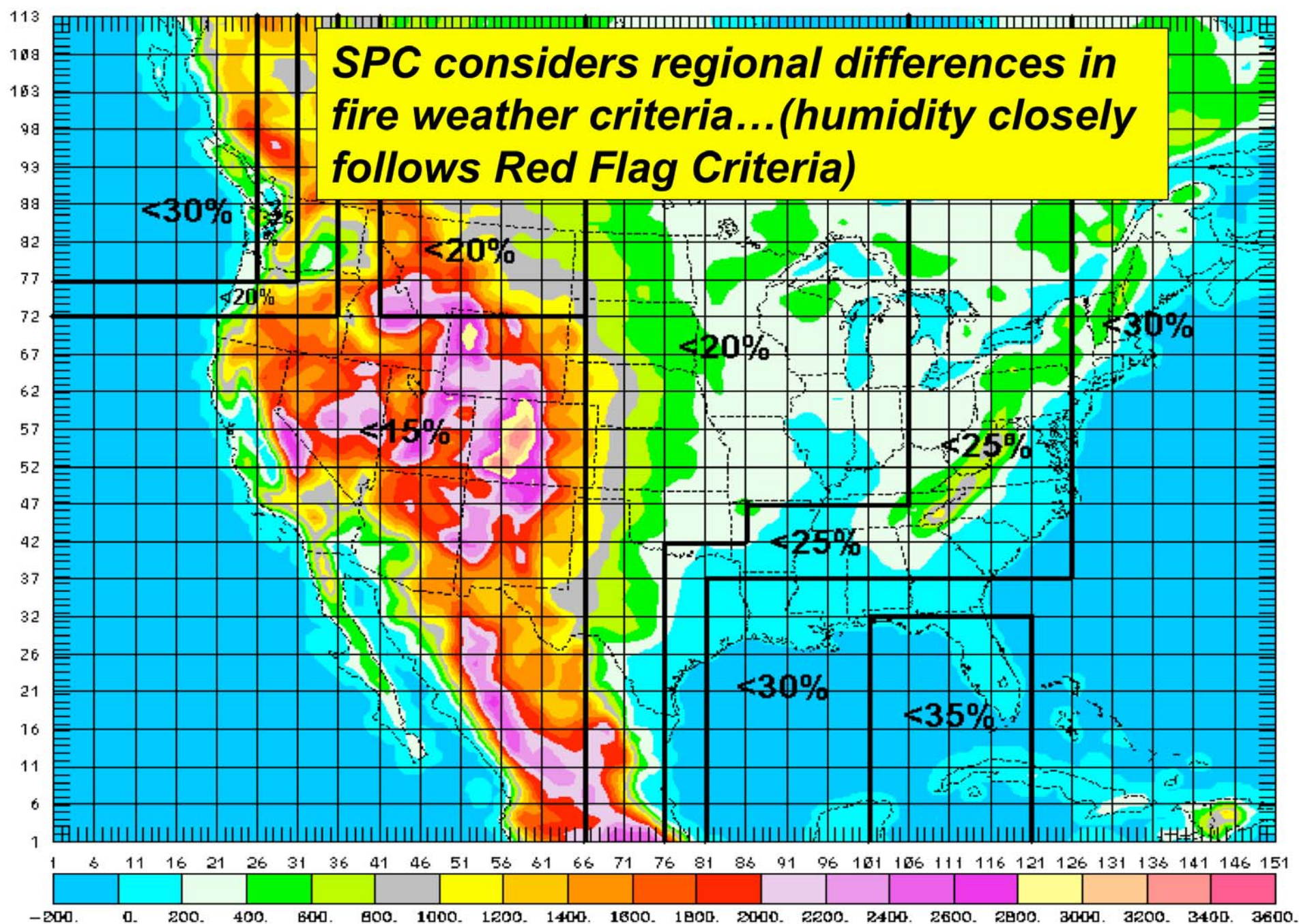


| | | | | | |
|-------------------------|-------------------|------------|--|-----------------------|-----------------------|
| U.S. Hazards Assessment | Base-Period Means | Wind Chill | Monthly & Seasonal SST Forecasts Nino 3.4 | Official SST Forecast | SST Base-Period Means |
|-------------------------|-------------------|------------|--|-----------------------|-----------------------|



How is the SPC prepared to issue National scale fire weather outlooks?

- Yearly training of SPC forecasters
- Products are issued year-round *We do it every day!!*
- One forecast desk devoted to fire weather for half of each midnight shift.
- Core forecasters have completed S390
- Core forecasters have attended yearly NIFC Fire Weather Course
- All SPC forecasters have been through fire weather training program
- SPC has developed unique data sets covering lower 48 states.
- “Chat room” and e-mails SPC Web Feedback page for field input *from* fire weather forecasters *to* SPC.
- Research and development efforts to provide new tools as well as verification

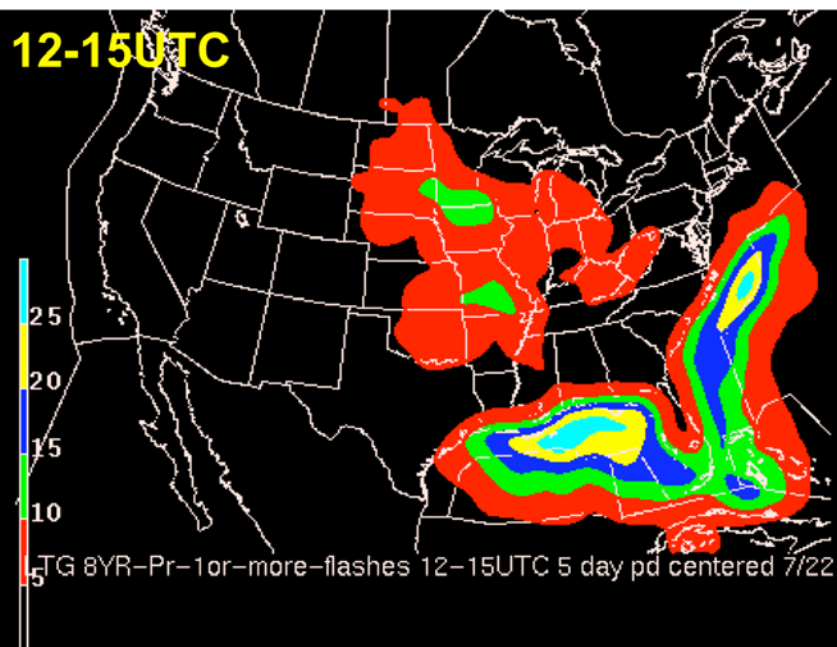


Regional critical relative humidity values used at the SPC

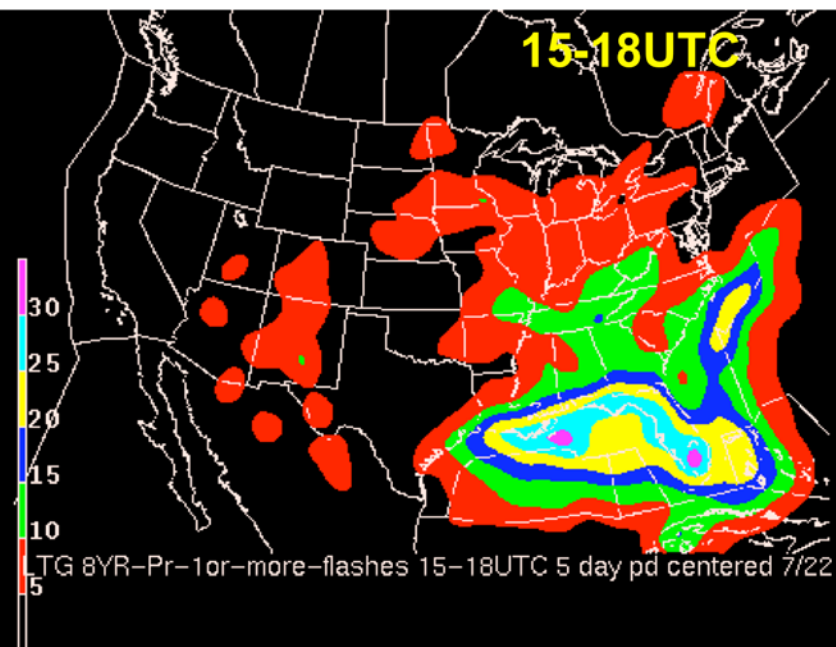
Data available at the SPC

1. METAR, RAWS, WIMS, and MESOWEST
2. Real-time and archived lightning data
3. Lightning Climatologies
4. Accumulated precipitation maps (ground & radar based)
5. National 2 and 4 km Radar images (precip accumulation)
6. Satellite images (bio-mass burning algorithm) of wildfires
7. 1 km resolution land use & high resolution terrain images.
8. Weekly Drought Monitor graphic.
9. All fire wx text forecasts, watches and warnings.
10. Model displays at 3-hour time resolution designed for fire weather forecasting (degrees F, RH (%), and wind (mph).
11. **Short Range Ensemble Forecasts (SREF) and Perfect Prog Lightning Forecasts**

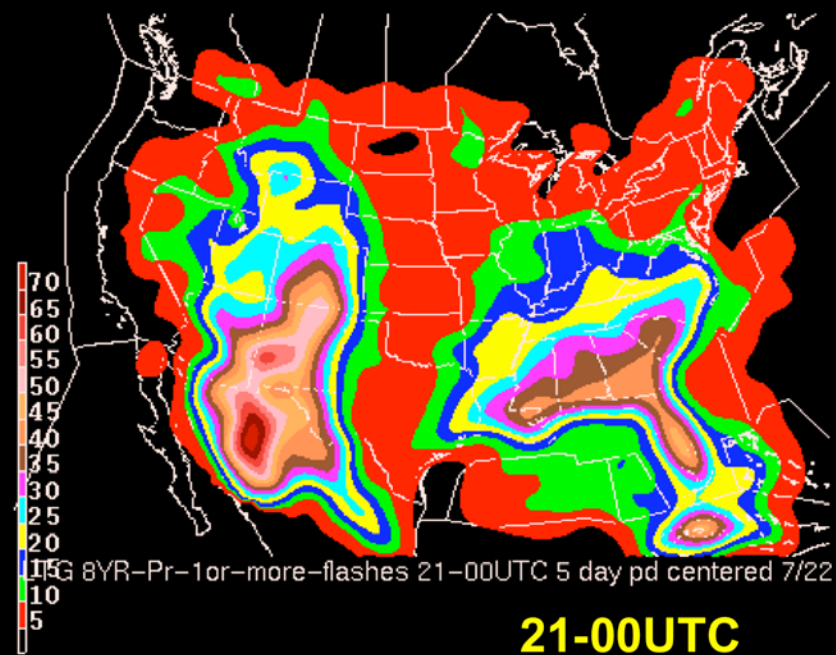
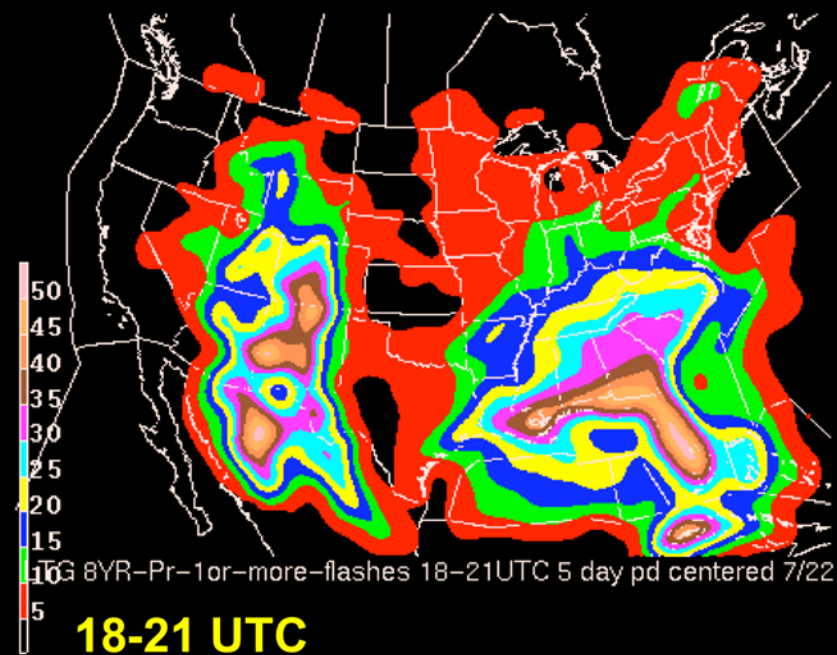
12-15UTC



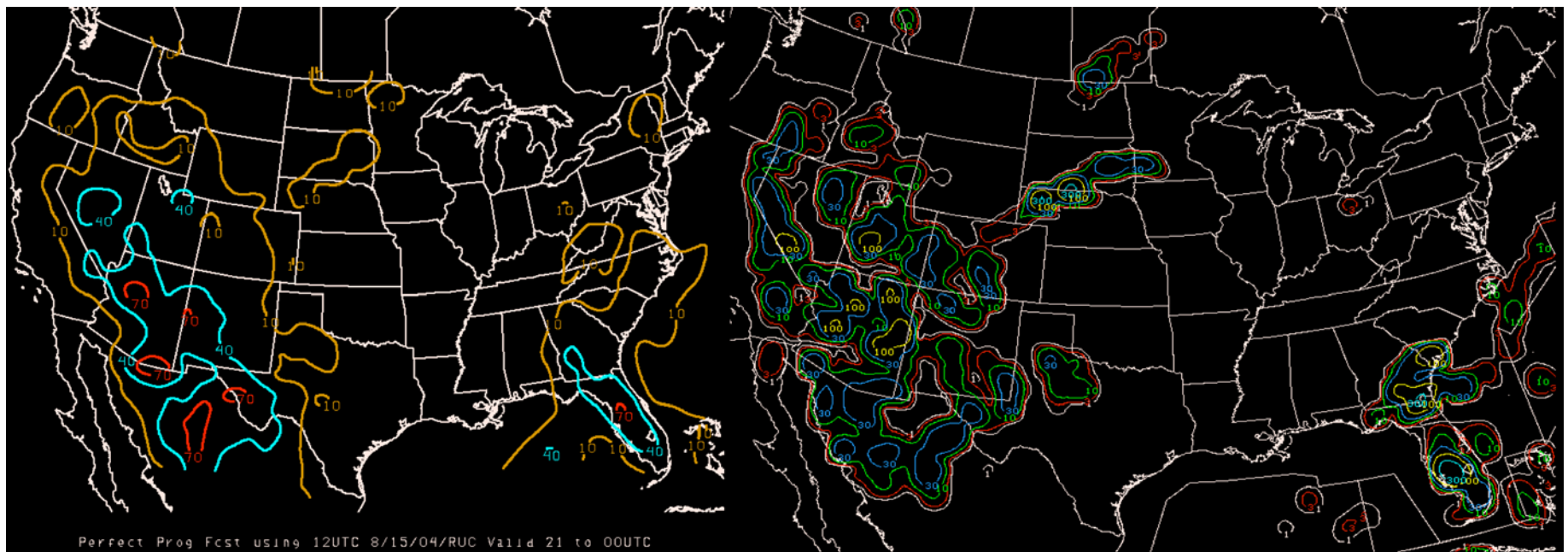
15-18UTC

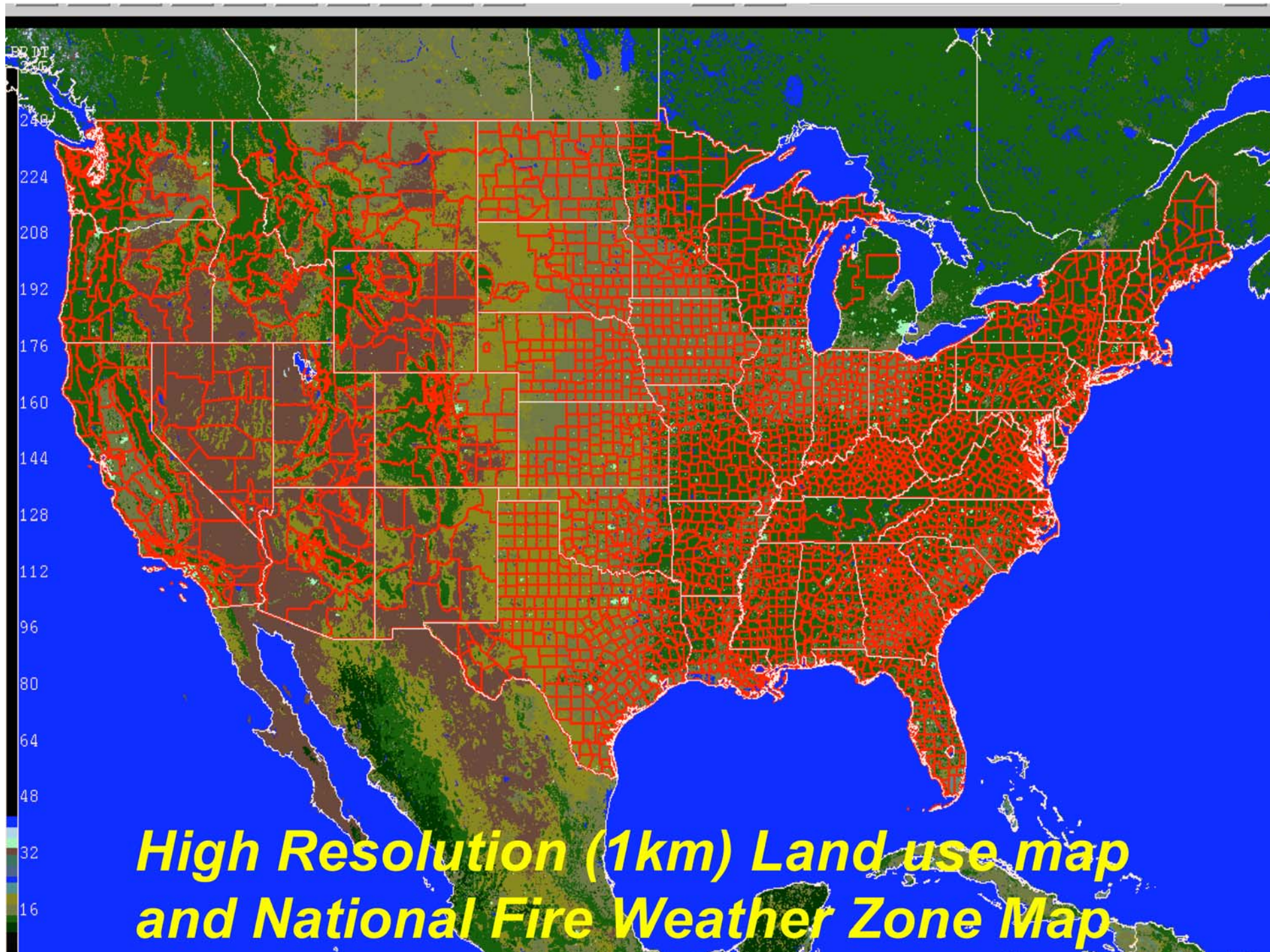


**LTG CLIMO: Probability of one or more CG flashes / 40x40 km grid box / 3 hrs.
Centered on July 22**



Example of a 9 to 12 hour forecast and the actual lightning (in each 40 x 40 km grid box) 8/15/04. Valid 21-00UTC.

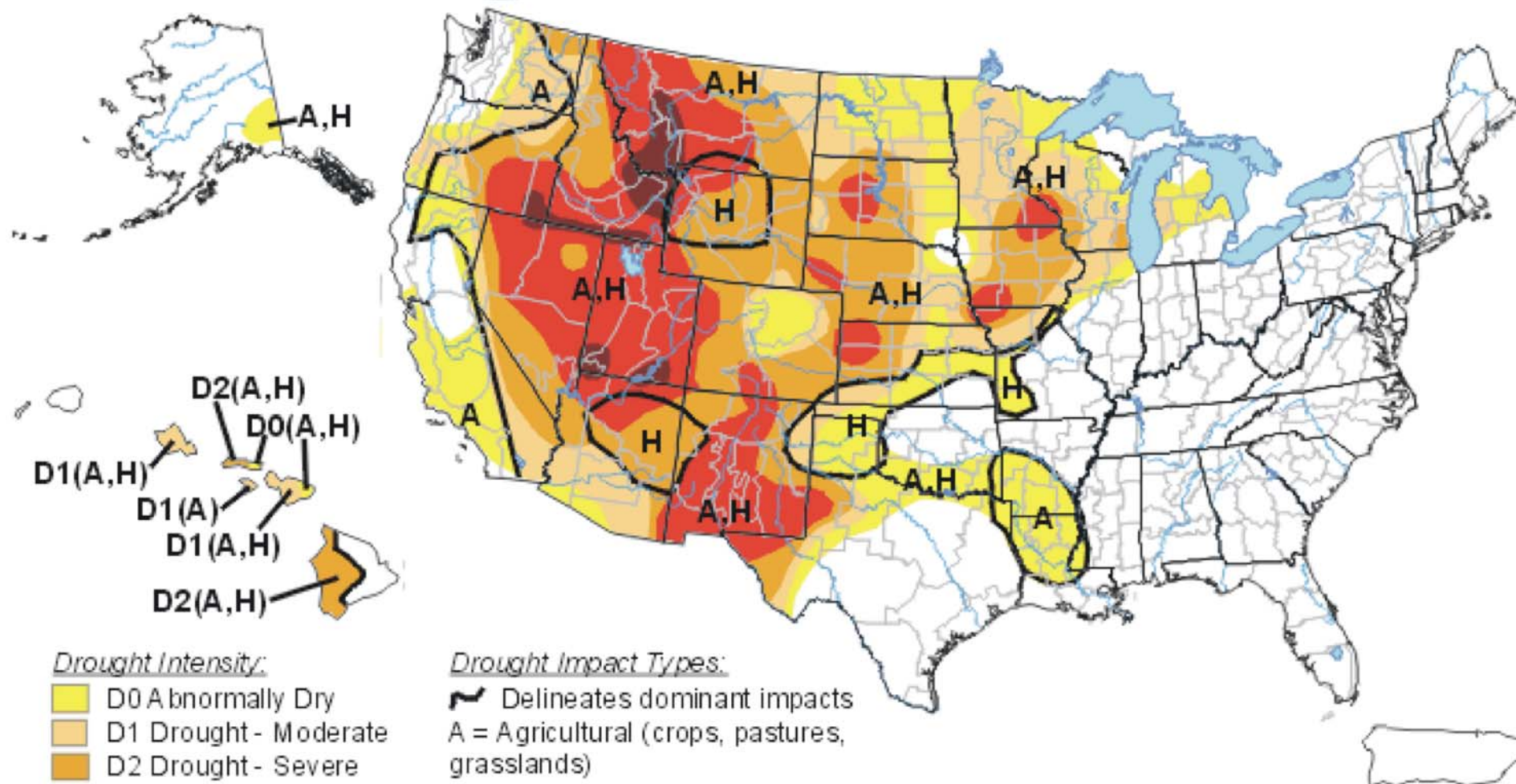




U.S. Drought Monitor

October 21, 2003

Valid 8 a.m. EDT



Drought Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
- (No type = Both impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



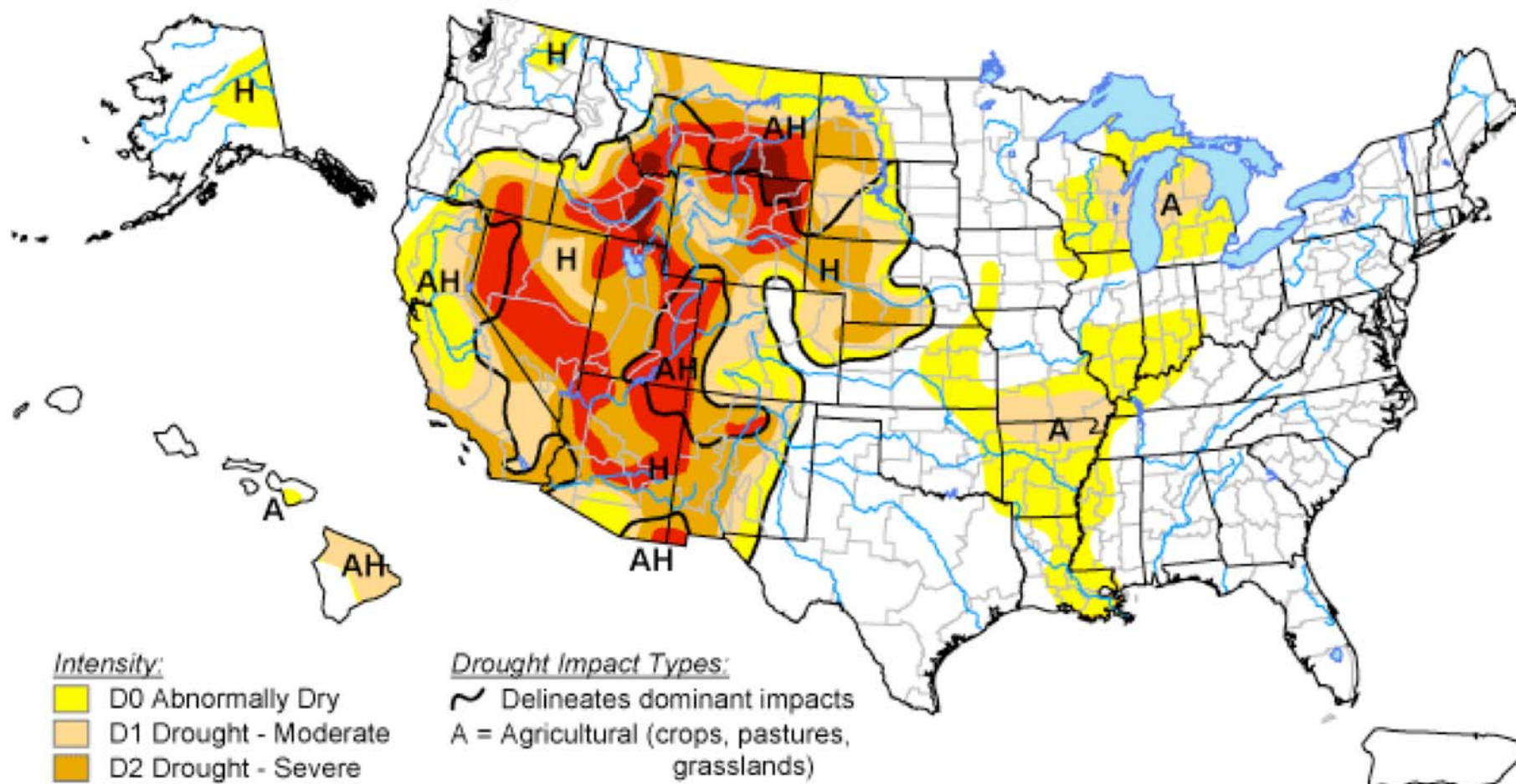
Released Thursday, October 23, 2003

Author: Richard Heim/Candace Tankersley, NOAA/NCDC

U.S. Drought Monitor

October 5, 2004

Valid 8 a.m. EDT



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

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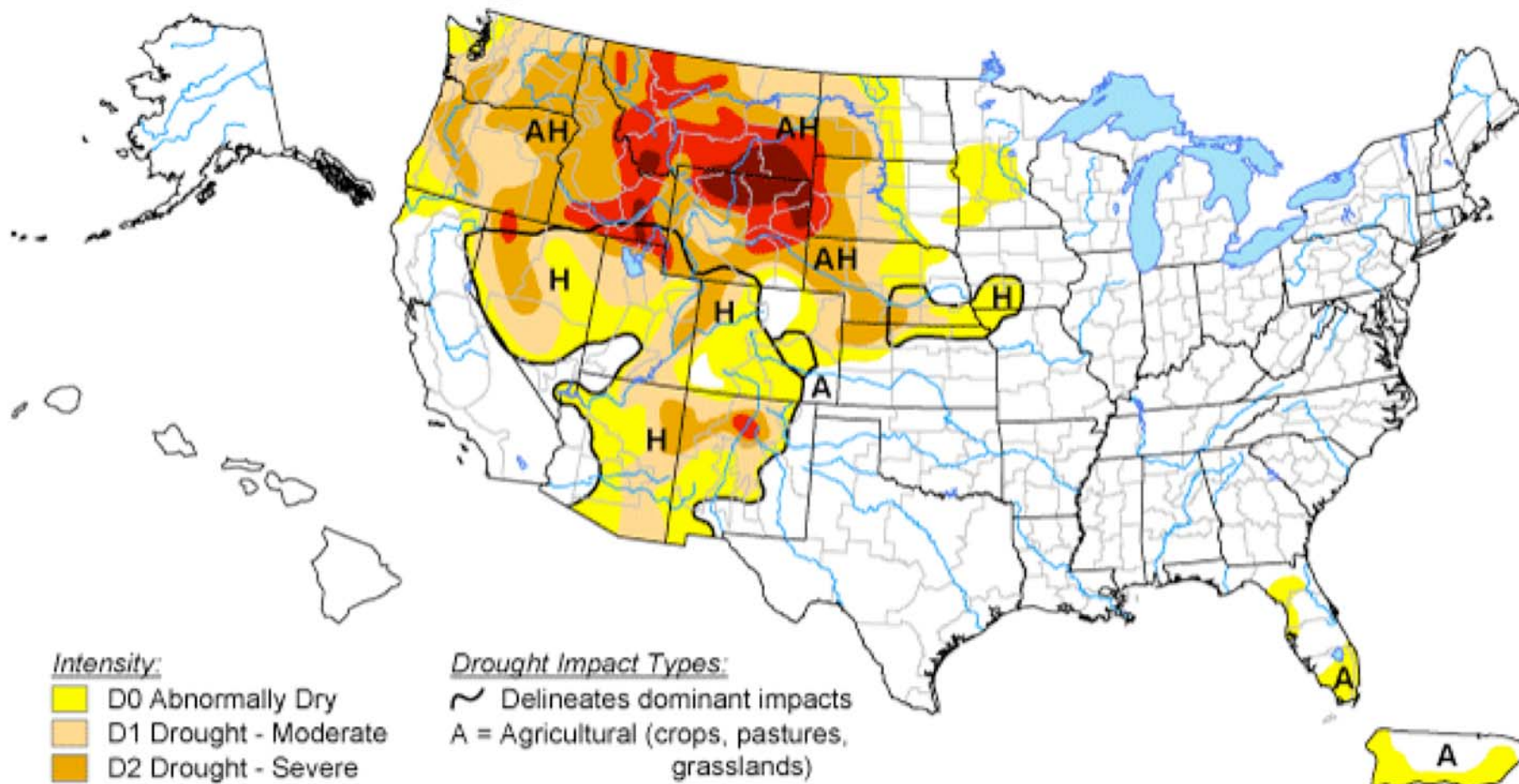
Released Thursday, October 7, 2004

Author: Michael Hayes, NDMC

U.S. Drought Monitor

March 1, 2005

Valid 7 a.m. EST



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>

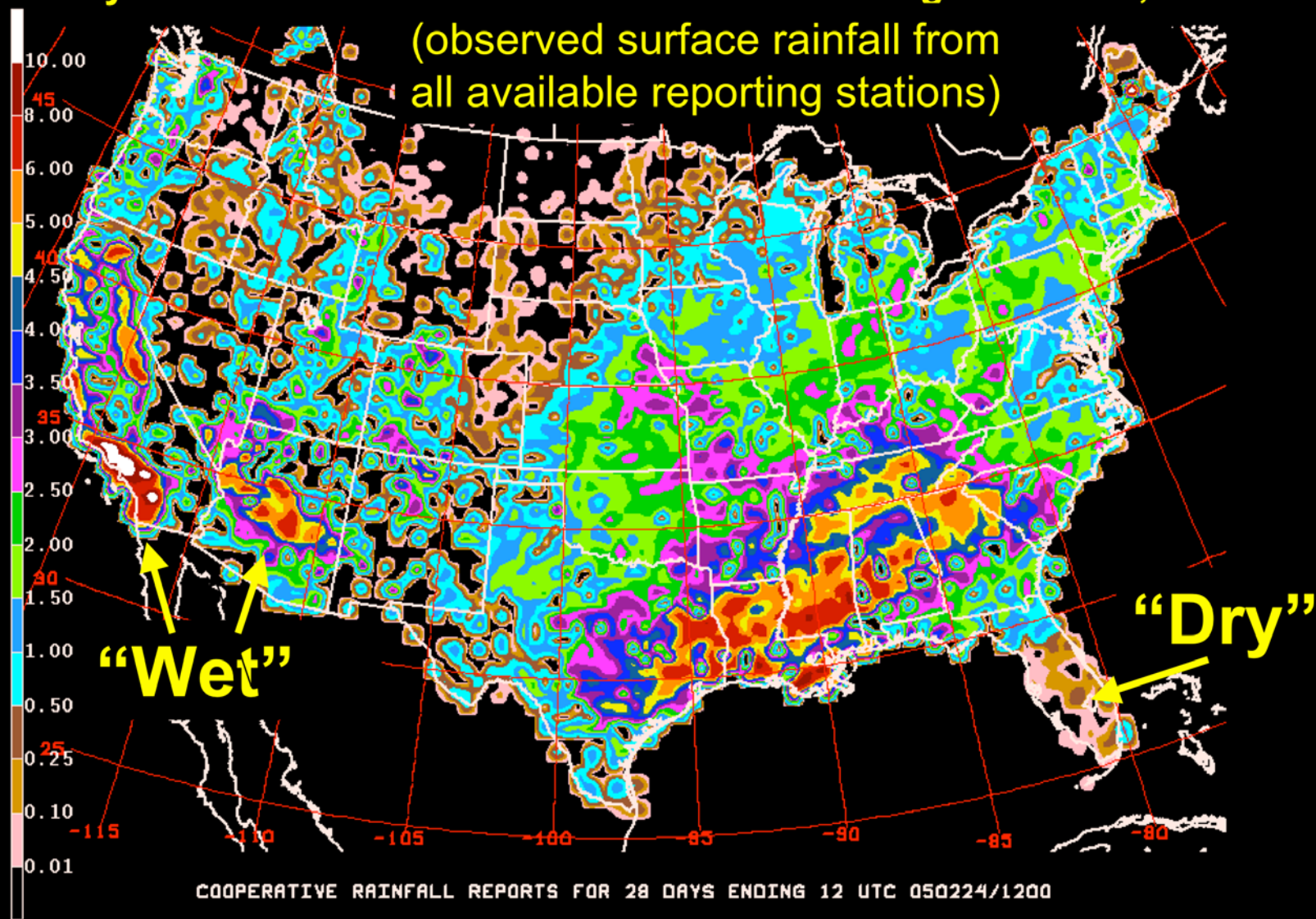


Released Thursday, March 3, 2005

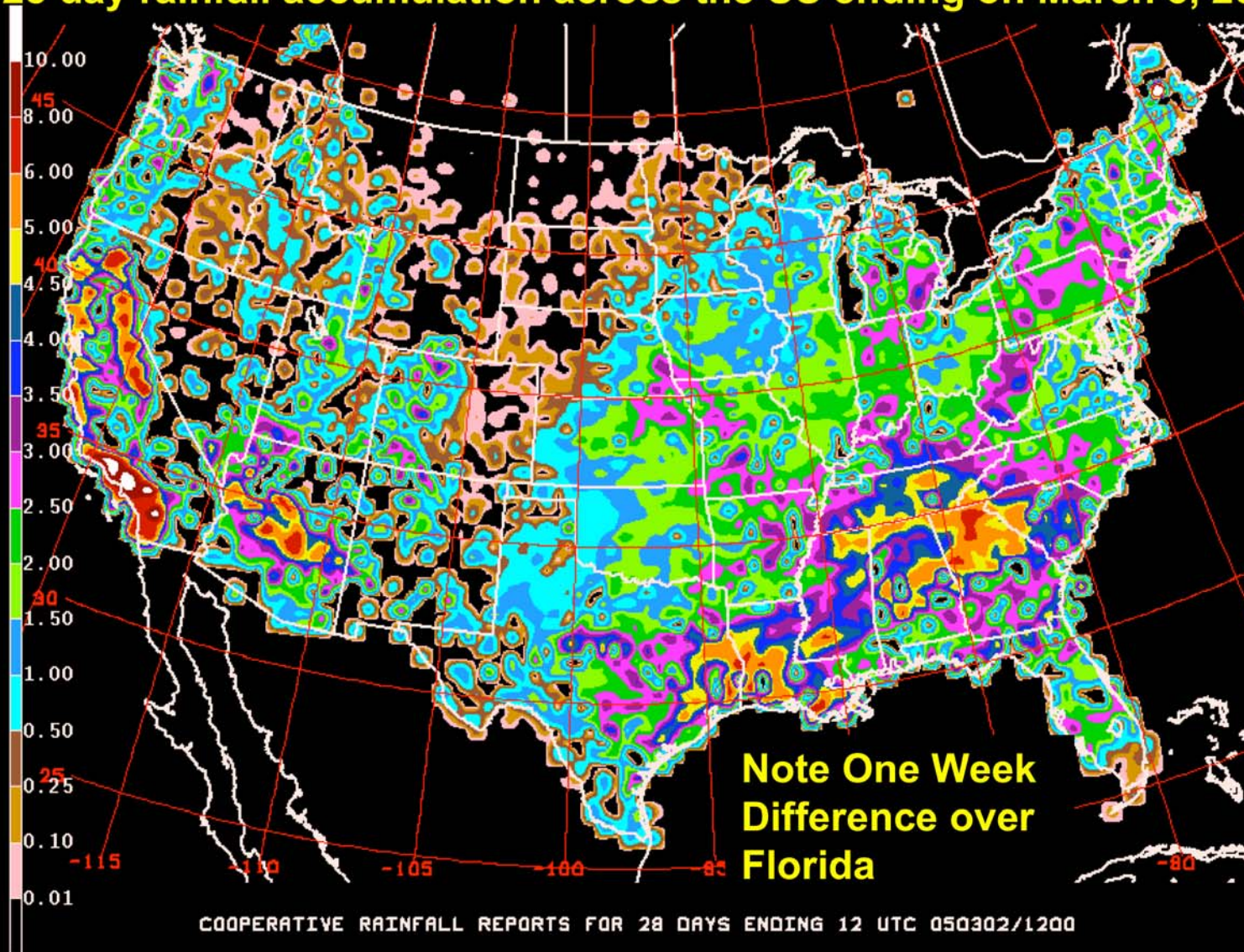
Authors: Richard Heim/Candace Tankersley, NOAA/NESDIS/NCDC

28 day rainfall accumulation across the US ending on Feb 24, 2005

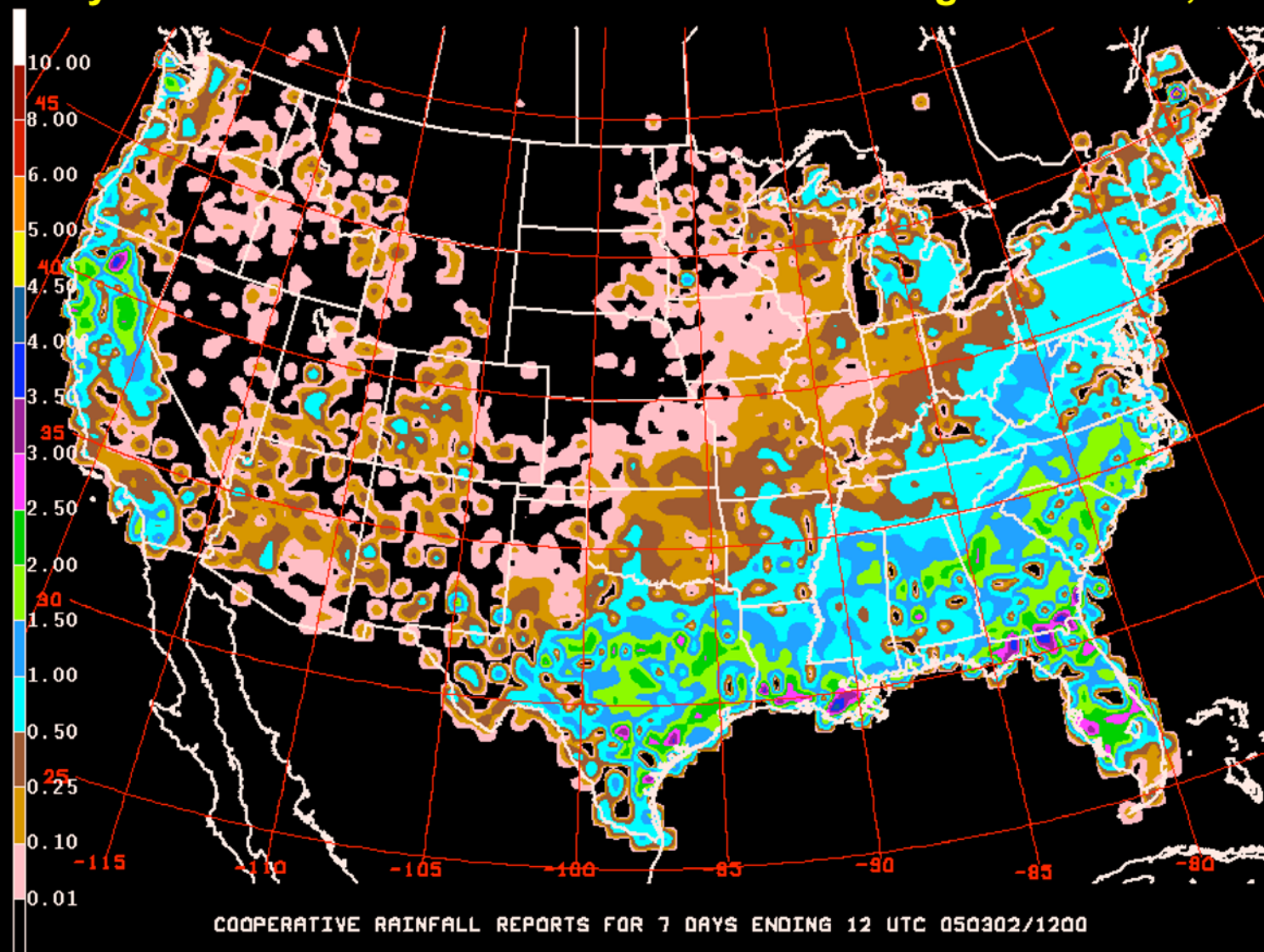
(observed surface rainfall from
all available reporting stations)



28 day rainfall accumulation across the US ending on March 3, 2005



7 day rainfall accumulation across the US ending on March 3, 2005



SPC Fire Weather Analysis Main Pages - Netscape

File Edit View Go Communicator Help

Members WebMail Connections BizJournal SmartUpdate Mktplace

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: http://www.spc.noaa.gov/exper/firecomp/

SPC Fire Weather Analysis Page

Storm Prediction Center

Norman, Oklahoma

UPDATE STATUS-->

SW Area finished processing 12Z run at: 14:26:20 UTC

NW Area finished processing 12Z run at: 14:39:15 UTC

Floater finished processing 12Z run at: 14:51:41 UTC

Choose a region below to view analysis

Southwest U.S.

Northwest U.S.

Floater Region

NEW for 2003

The SPC will experimentally generate short-term model graphics and current analysis graphics containing weather parameters deemed important for fire weather forecasting. These plots can then be overlaid onto either a GOES satellite derived active fire image, or the land-use maps shown to the left. Two of the regions will usually be set over the Western U.S. while a third region will be used as a "floater", to be set by an SPC fire weather forecaster based on fire weather conditions described in the [Day 1 or Day 2 Fire Weather Outlooks](#).

Welcome to the [Storm Prediction Center's](#) Fire Weather Analysis page. This page features forecast and analysis fields that are commonly used at the SPC to assess the potential for increased wild fire activity on a national to regional scale.

The forecast fields are calculated from the latest available Eta Model. The objective analysis (SPC OA) data is produced from a 2-pass Barnes objective analysis using the latest surface data and latest available RUC forecast as a first guess.

These pages will update hourly throughout the day and can be used to compare or verify short-term model forecasts and outlooks with observed conditions over the areas of concern. This type of mesoscale information will primarily assist forecasters with a need to quickly ascertain fire weather conditions during the afternoon and evening hours of the day 1 period.

Current Day1 Fire Weather Outlook

Critical Area

Critical Area - Dry Tstm

Document: Done

SPC FIRE WEATHER COMPOSITE MAPS - Netscape

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Bookmarks Location: <http://www.spc.noaa.gov/exper/firecomp/sw/>



Fire Weather Web Tool

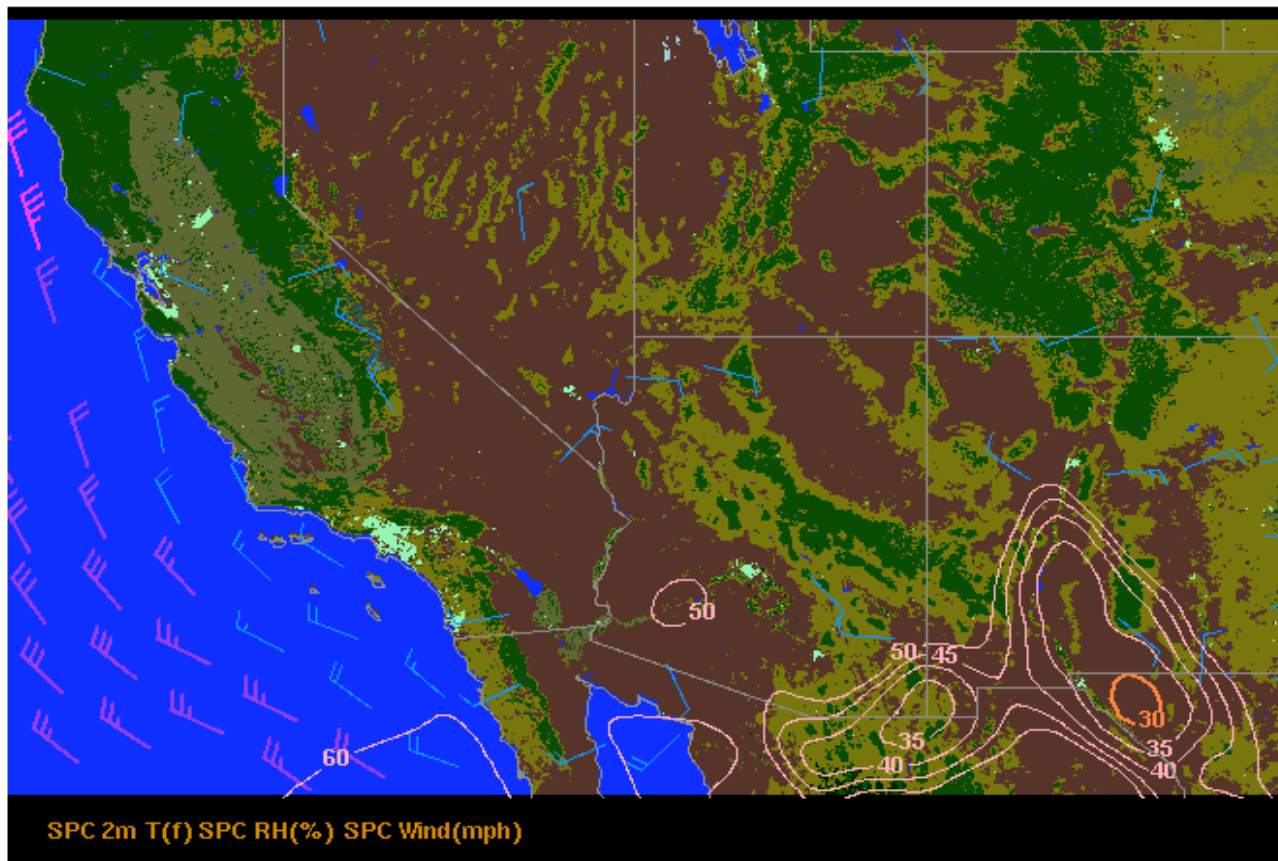
12Z ETA Model Run Valid:

| | | | | |
|----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 03/02/04 Local Time: | 11AM PT 12PM MT | 02PM PT 03PM MT | 05PM PT 06PM MT | 08PM PT 09PM MT |
| UTC Forecast Date/Time: | 02/18Z | 02/21Z | 03/00Z | 03/03Z |
| 2m T(f) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| 2m RH(%) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| Wind(mph) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| Haines(low) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| Haines(mid) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| Haines(high) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| LASI (4-10) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| Fosberg | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |

Objective Analysis Data Valid: 15 Z

| | |
|----------------------------|---|
| Radar Summary/HPC Fronts | <input type="checkbox"/> IMG |
| SPC OA Temp(f) | <input checked="" type="checkbox"/> IMG |
| SPC OA RH(%) | <input checked="" type="checkbox"/> IMG |
| SPC OA Wind(mph) | <input checked="" type="checkbox"/> IMG |
| SPC Fire Weather Outlook | <input type="checkbox"/> IMG |
| Land Use Background Image: | <input checked="" type="checkbox"/> ON |

[BACK TO MAIN PAGE](#)



SPC FIRE WEATHER COMPOSITE MAPS - Netscape

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Bookmarks Location: <http://www.spc.noaa.gov/exper/firecomp/sw/>



Fire Weather Web Tool

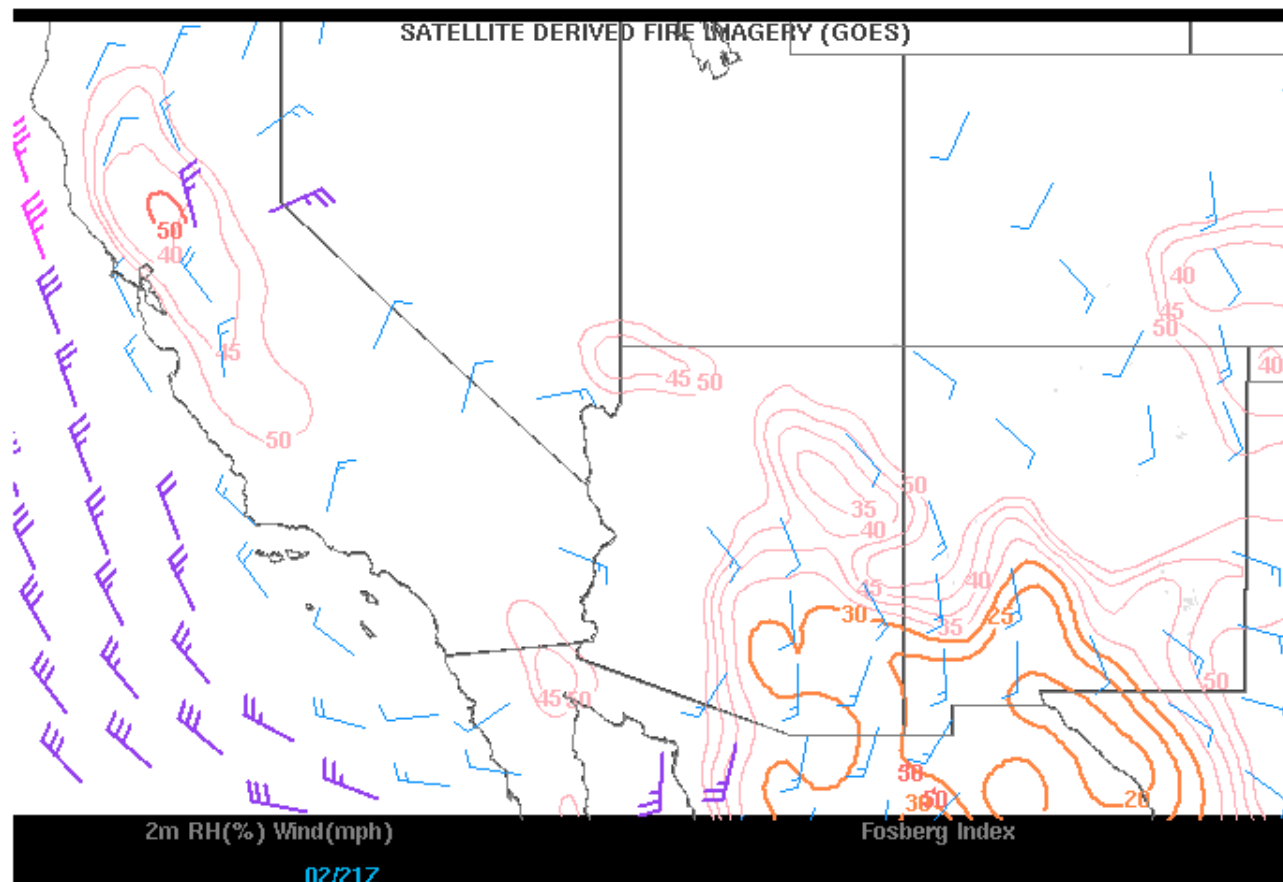
12Z ETA Model Run Valid:

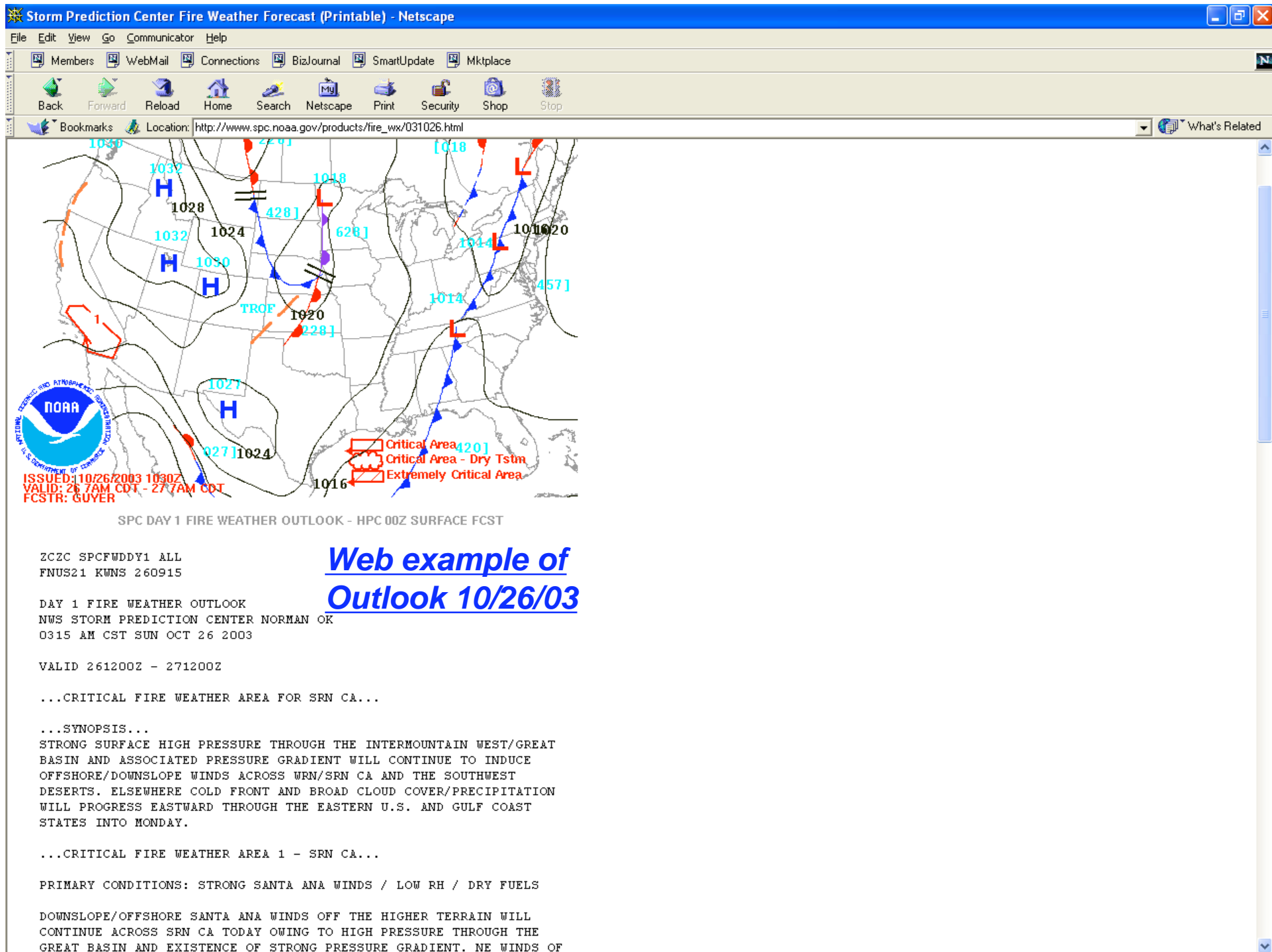
| 03/02/04 Local Time: | 11AM PT 12PM MT | 02PM PT 03PM MT | 05PM PT 06PM MT | 08PM PT 09PM MT |
|----------------------------|------------------------------|---|------------------------------|------------------------------|
| UTC Forecast Date/Time: | 02/18Z | 02/21Z | 03/00Z | 03/03Z |
| 2m T(f) | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| 2m RH(%) | <input type="checkbox"/> IMG | <input checked="" type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
| Wind(mph) | <input type="checkbox"/> IMG | <input checked="" type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |
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| Fosberg | <input type="checkbox"/> IMG | <input checked="" type="checkbox"/> IMG | <input type="checkbox"/> IMG | <input type="checkbox"/> IMG |

Objective Analysis Data Valid: 15 Z

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|----------------------------|------------------------------|
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| SPC OA Wind(mph) | <input type="checkbox"/> IMG |
| SPC Fire Weather Outlook | <input type="checkbox"/> IMG |
| Land Use Background Image: | <input type="checkbox"/> ON |

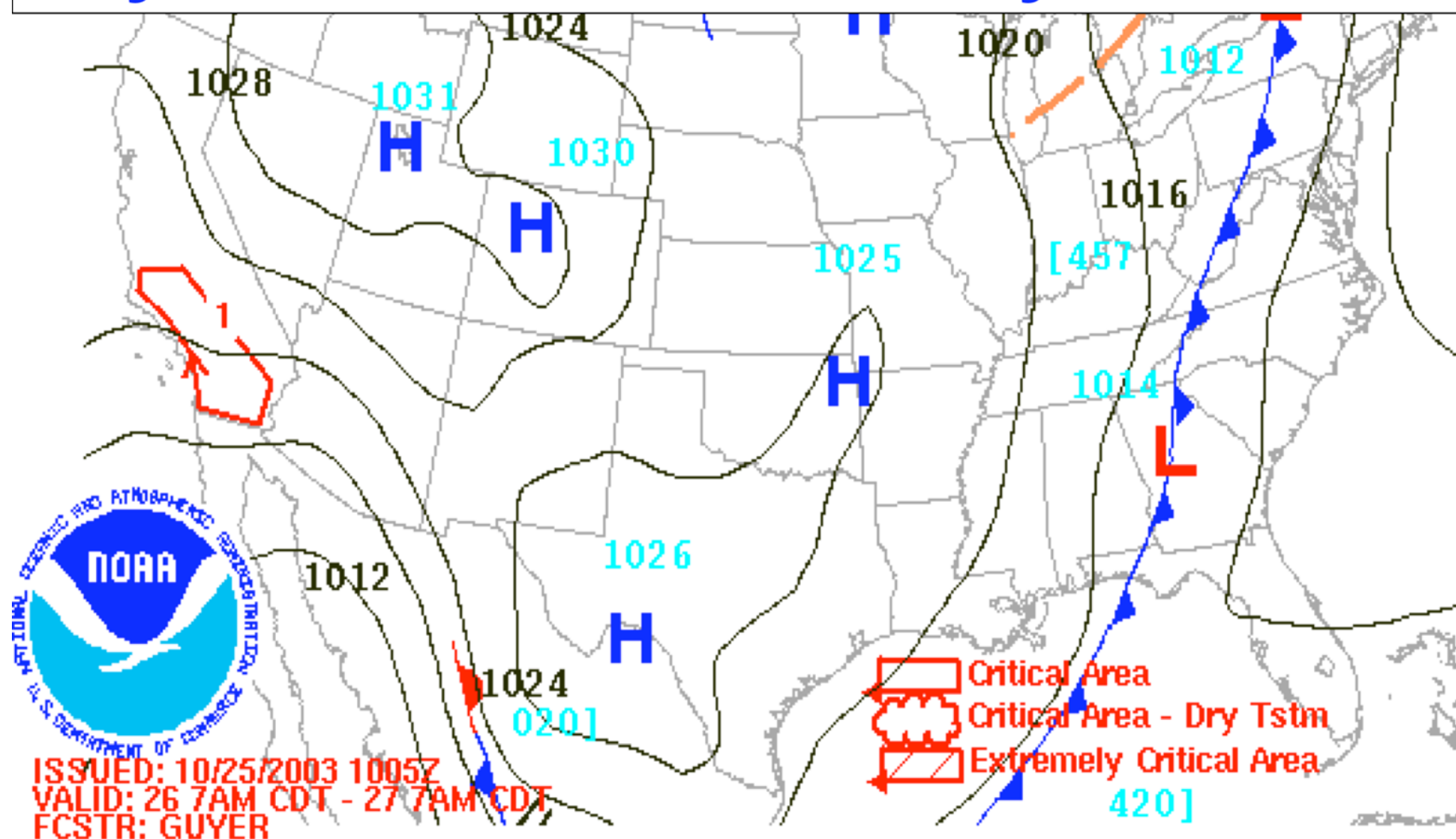
[BACK TO MAIN PAGE](#)





EXAMPLE – California Wildfires Oct 2003

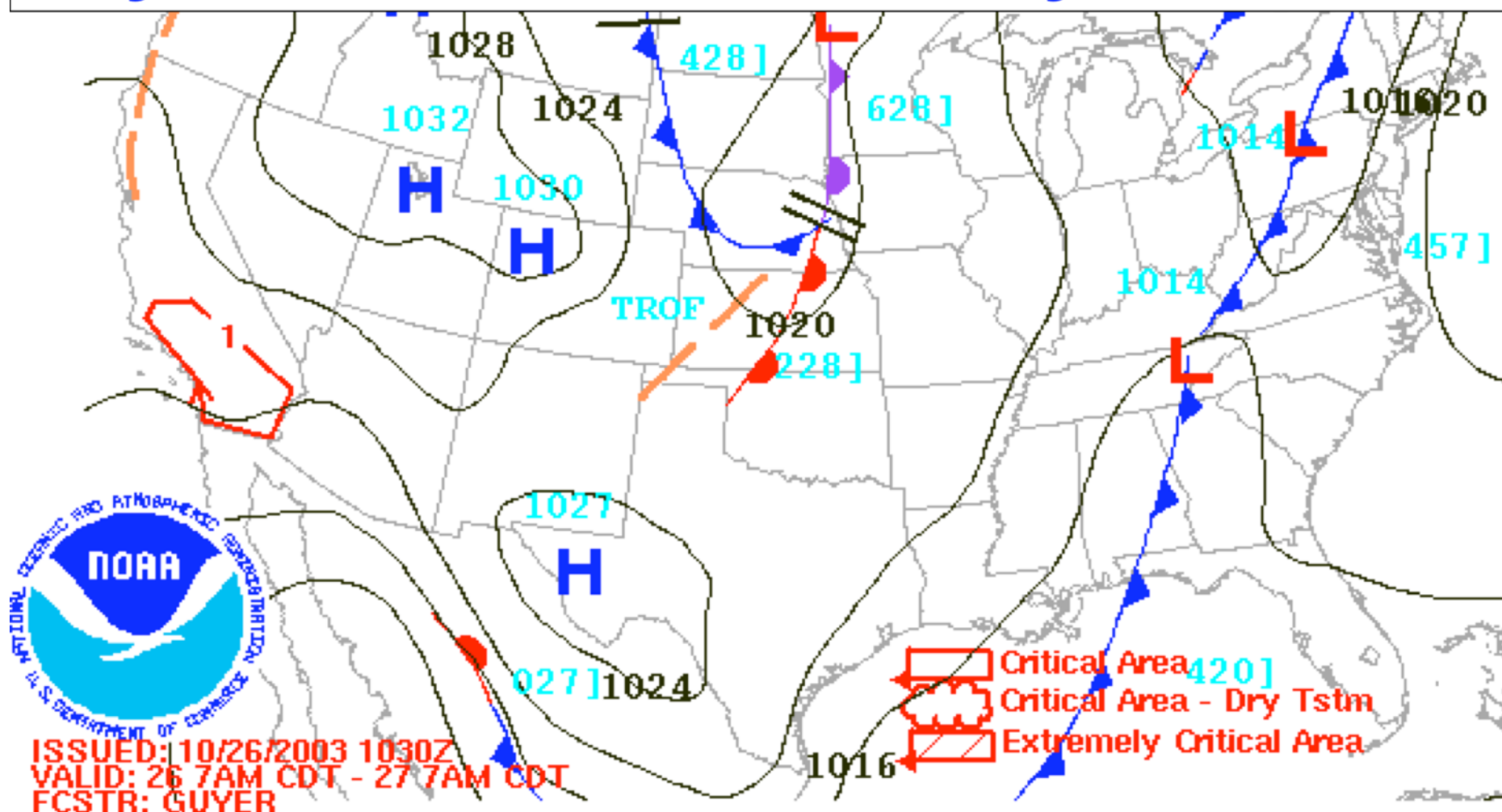
Day 2 Forecast valid Sunday, Oct. 26th

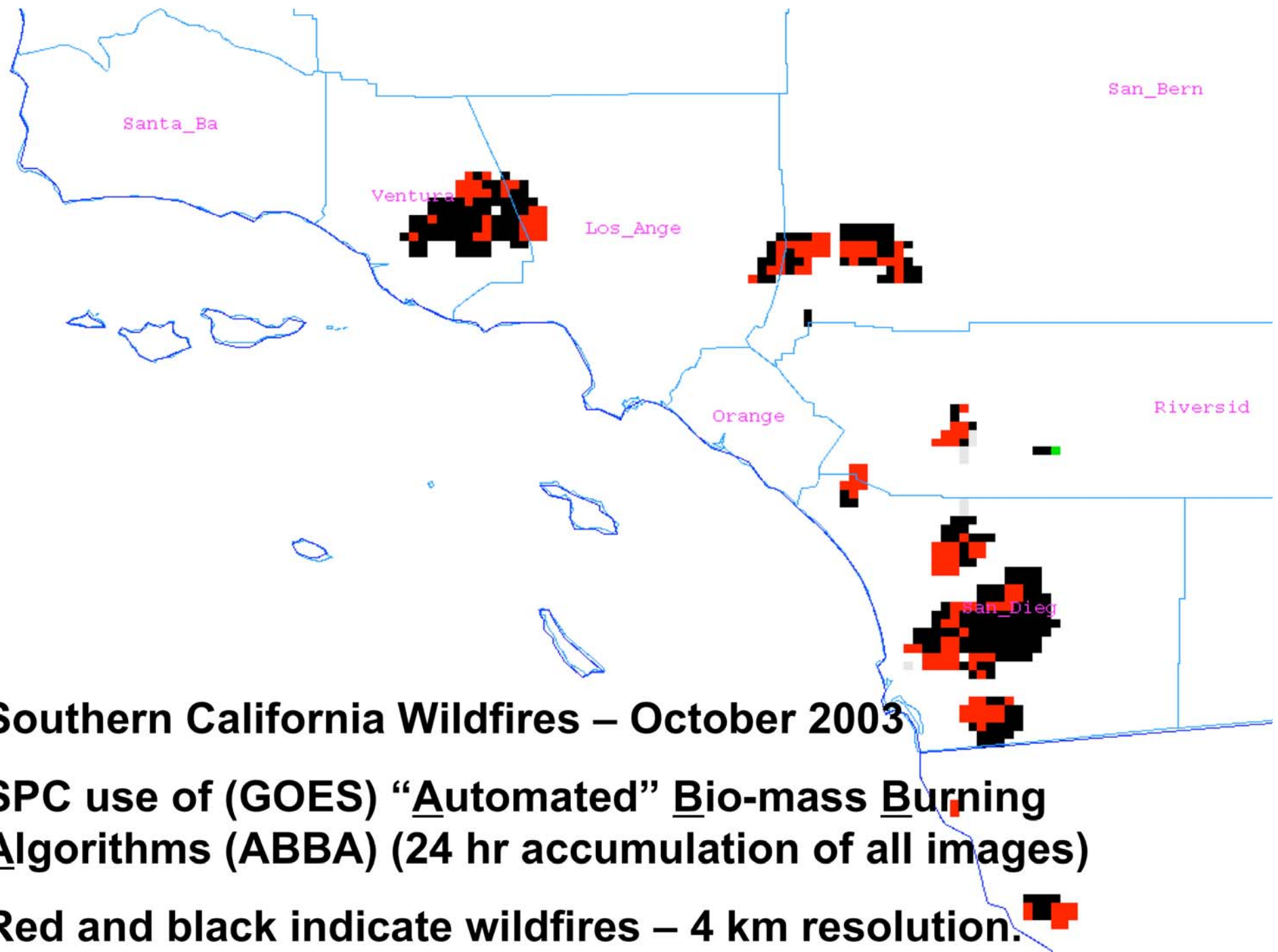



SPC DAY 2 FIRE WEATHER OUTLOOK - HPC 00Z SURFACE FCST

EXAMPLE – California Wildfires Oct 2003

Day 1 Forecast Valid Sunday, Oct. 26







Lightning Forecasts

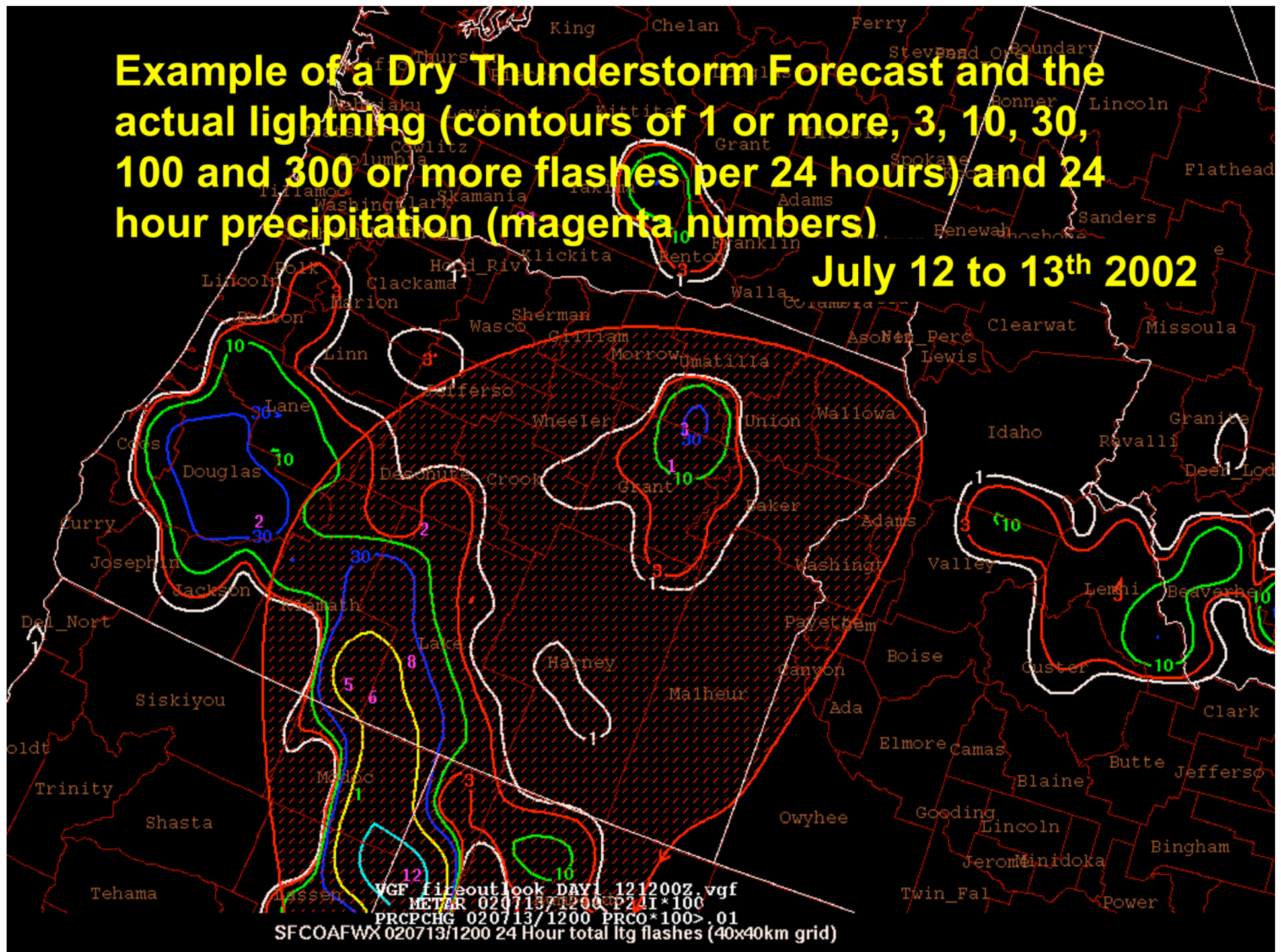
❖ The Difference between a Wet or Dry Thunderstorm

Dry Thunderstorm (Dry Lightning) – a subset:

- ***A storm produced by a cumulonimbus cloud(s) accompanied by lightning, gusty wind, and little or no precipitation (i.e., 0.10 inch or less)***
- ***SPC will focus on situations where numerous dry thunderstorms are expected- “Lightning Bust”***

Example of a Dry Thunderstorm Forecast and the actual lightning (contours of 1 or more, 3, 10, 30, 100 and 300 or more flashes per 24 hours) and 24 hour precipitation (magenta numbers)

July 12 to 13th 2002



SPC Fire Weather Outlooks

SPC and other National Centers provide valuable information as partners with WFOs and other agencies involved in fire weather forecasting.

The SPC outlooks have been issued daily as experimental products since 1998 and as operational products since 2000.

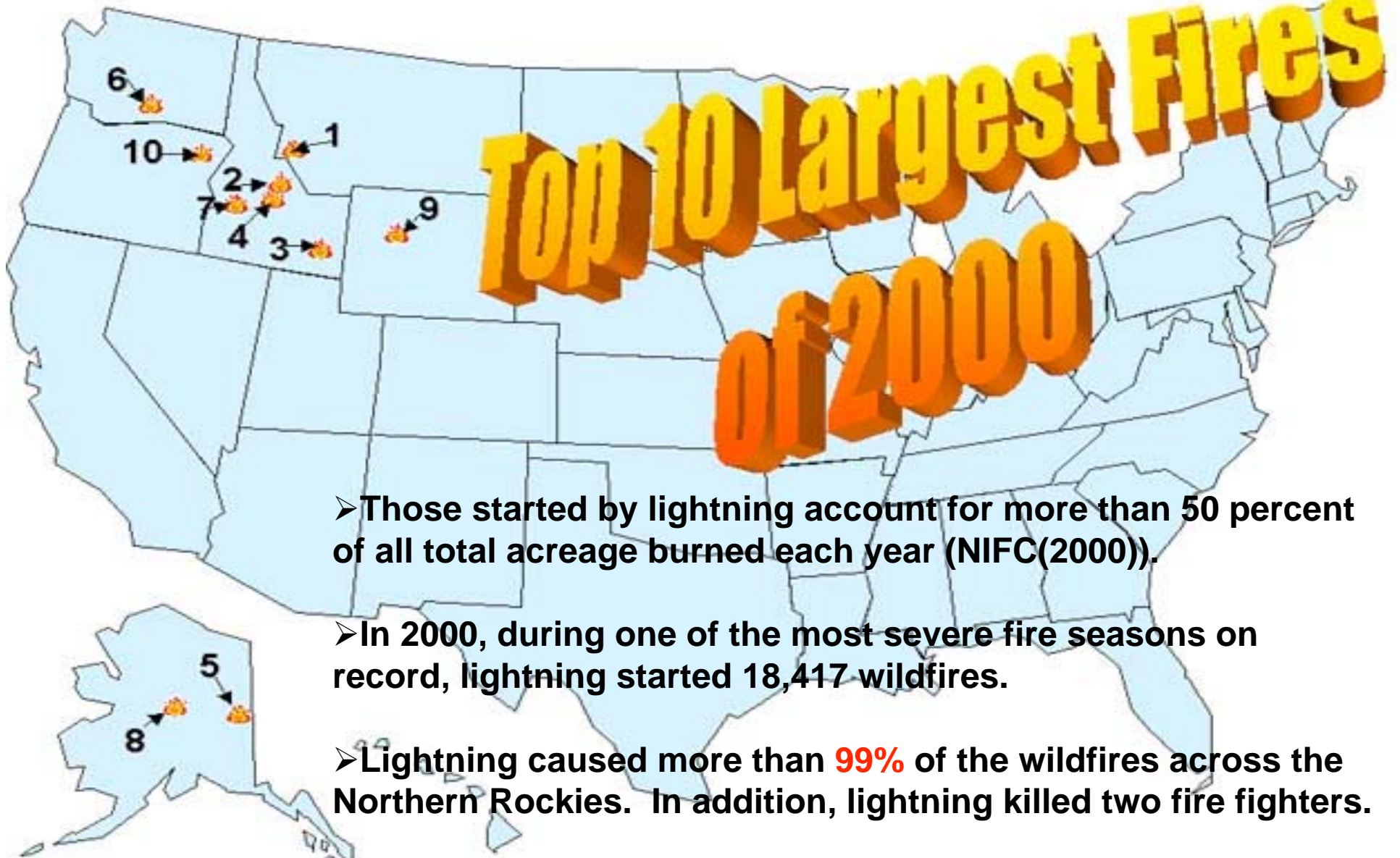
The SPC has been able to incorporate many different and unique data sets to aid in outlook preparation.

Verification of outlooks will be ongoing and evolving with time.

Remember:

www.spc.noaa.gov/fire

Top 10 Largest Fires of 2000



- Those started by lightning account for more than 50 percent of all total acreage burned each year (NIFC(2000)).
- In 2000, during one of the most severe fire seasons on record, lightning started 18,417 wildfires.
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TRANSFERRING RESEARCH INTO OPERATIONS

FORECAST VERIFICATION

FOSBERG FIRE WEATHER INDEX -EXAMPLES



Example: Temp - 75, RH - 40%, Wind - 20 mph...SPC Fosberg FWI is 39

Example: Temp - 75, RH - 25%, Wind - 20 mph...SPC Fosberg FWI is 47

Example: Temp - 75, RH - 15%, Wind - 20 mph...SPC Fosberg FWI is 79

SPC VERIFICATION SCHEME

VERIFICATION EFFORTS INCLUDE THE DEVELOPMENT OF GRIDDED DATA FOR THE FOLLOWING 7 MAIN CATEGORIES

- ◆ **WEATHER CONDITIONS** - The SPC Fosberg Fire Weather Index (weather conditions of temperature, relative humidity, and wind speed)
- ◆ **FIRE DANGER CLASS RATINGS** - computed by USFS (high, very high, or extreme fire danger)
- ◆ **DEAD FUEL MOISTURE VALUES** - computed at SPC using software routines supplied by USFS Fire Sciences Lab
- ◆ **STATION PRECIPITATION** (analyzed to 40*40 km grid) plus 4*4 km resolution WSR-88D nationwide precipitation estimates
- ◆ **LIGHTNING FLASHES** (analyzed to 40*40km grid)
- ◆ **4KM RESOLUTION IMAGES** of all fires detected during 24-hour (12 to 12 UTC) time period using bio-mass burning algorithms
- ◆ **HIGH RESOLUTION FUEL MODEL MAP** (1km resolution)